

MIMULUS HYMENOPHYLLUS (SCROPHULARIACEAE),
A NEW SPECIES FROM THE SNAKE RIVER
CANYON AREA OF EASTERN OREGON

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ABSTRACT

Mimulus hymenophyllus, a new perennial species recently discovered growing on canyon walls in eastern Wallowa County, Oregon is described and illustrated. The new taxon appears morphologically and ecologically closest to *M. jungermannioides*, an allopatric species occurring to the west in the Columbia Basin. *Mimulus hymenophyllus* also shows affinities to *M. moschatus*, *M. floribundus*, and *M. arenarius* through similarities in the nature of the specialized glandular pubescence and the distinctive calyx structure. Based on these characters it is placed with this species group in the sect. *Paradanthus*.

Extreme northeastern Oregon is one of the botanically least explored areas of the western United States. Of particular interest within this region is the rugged corridor of ridges and canyons immediately west of the Snake River in Wallowa County, paralleling the Idaho border from the Wallowa Mountains north to the Washington state line. During a recent collecting trip here an undescribed, perennial species of *Mimulus* was discovered growing in diffuse sunlight in the moist cracks of deteriorating basalt cliffs. This fragile monkeyflower is the only member of its genus whose known geographic range is confined to Oregon, although it would not seem unreasonable to expect that future field work may uncover it in similar habitat in adjacent Idaho as well.

***Mimulus hymenophyllus* Meinke, sp. nov.**

Herbae perennes, pubescentes, viscido-villosae; caulibus infirmis, 0.5–2.5 dm longis, suberectis, ramis paucis, internodis longis; foliis caulium paucis, oppositis, tenuibus, late lanceolatis vel ovatis, denticulatis, 1.0–3.5 cm longis, petiolo lamina plerumque longiore, divaricato; pedicellis axillaribus, tenuibus, reflexis aut ascendentibus; calyce in statu florifero (2.5–)3.5–5.5(–6.0) mm longo, in statu fructifero late campanulato, infirme angulato, 4.0–7.0 mm longo, dentibus ciliatus, 0.5–1.2 mm longis, aequalibus, late triangularibus, acutis; corolla flava, infundibulari, (15–)18–28 mm longa, calyce 3–4 plo longiore, tubo angusto, exserto, labiis plus minusve inaequalibus, patulis; staminibus stylo brevioribus, inclusis, glabris; stylo fere glabro, incluso, labiis stigmatis \pm aequalibus; capsula inclusa, subglobosa; seminibus

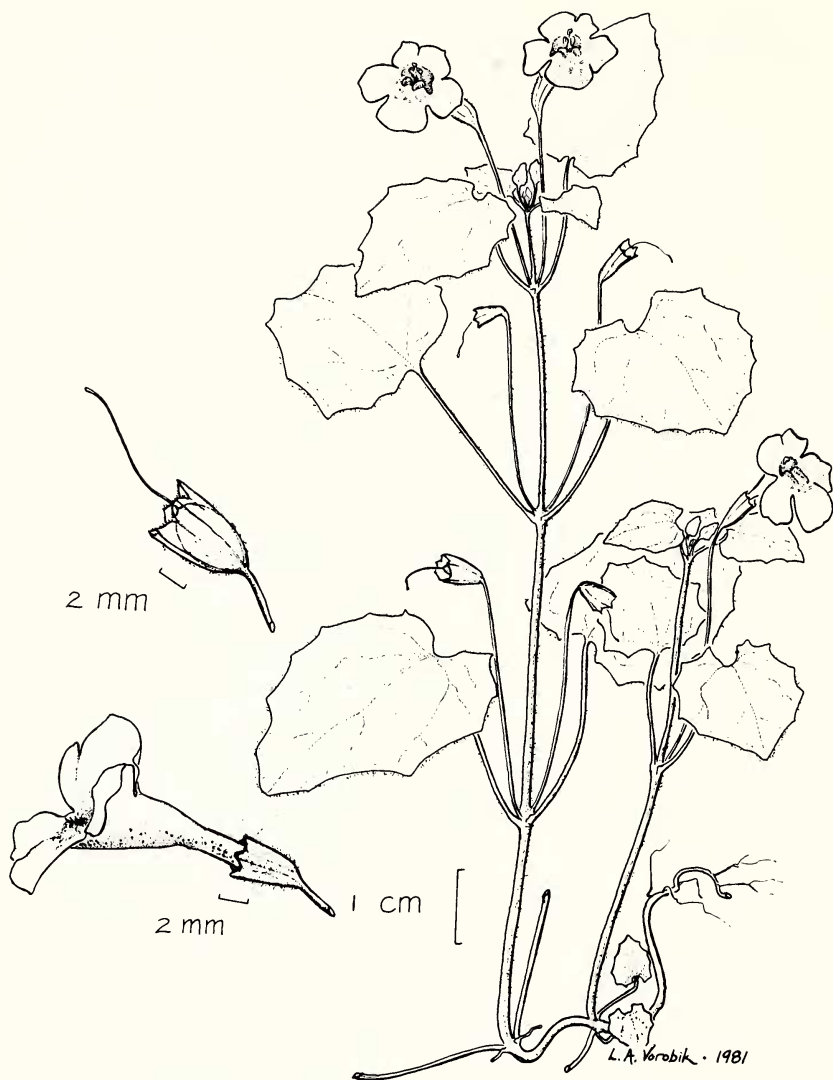


FIG. 1. *Mimulus hymenophyllus* Meinke. A. Habit. B. Flower, depicting relationship of calyx and corolla length. C. Fruiting calyx, enveloping mature capsule.

(0.5)–0.65–0.85 mm longis, late oblongis, longitudinaliter rugatis (Fig. 1).

Delicate perennial herb, typically growing in masses, prostrate to suberect, sparsely glandular-villous with slimy-viscid transparent hairs

less than 0.8 mm long; stems few to several, fragile and thin, 0.5–2.5 dm long, winged, arising from numerous reddish-orange capillary rhizomes, sparingly branched throughout, with long internodes; leaves few, cauline and basal, generally 3–7 opposite pairs per primary stem; leaf blades thin, filmy, broadly lanceolate to ovate, acute, subpalmately veined, 1.0–3.5 cm long and equally wide or slightly less, shallowly denticulate to nearly entire, broadly triangular at the base and tapering or occasionally cordate; petioles of cauline leaves equal to or usually exceeding the leaf blades, generally less than the internodes, diverging, prominently winged; flowers in axillary pairs; pedicels narrower than the petioles, slightly winged at the base, reflexed or usually ascending, ranging from 0.5–1.8 times the petiole length but seldom exceeding the blades; calyx green, the tube narrowly triangular and evidently angled, acute at the base or slightly rounded, with scattered glands on the angles, calyx in its entirety (2.5–)3.5–5.5(–6.0) mm long at anthesis, moderately inflated in fruit, becoming campanulate but not lengthening significantly, up to 7.0 mm long and nearly as wide; calyx teeth equal, 0.5–1.2 mm long, about half again as broad, deltoid and abruptly acute in flower, rounded and mucronate in late fruit, with simple acrose eglandular cilia on the margins; corolla funnel-form, weakly bilabiate with an open orifice, (15–)18–28 mm long (3–4 times the length of the calyx), light yellow with scattered red or purplish dots on the throat and lower lobes, puberulent externally with a tuft of thickened yellow hairs on the inner lower lip, the tube half again as long as the calyx, the throat moderately flaring, the lobes short and spreading, typically entire or apically notched; stamens glabrous, included, $\frac{1}{2}$ – $\frac{3}{4}$ the length of the corolla; style glabrous or with a few hairs, included, exceeding the stamens; stigma lips \pm equal and rounded, glabrous or not; capsule essentially glabrous, oval to rounded, the tip abruptly apiculate to shallowly retuse, barely included in the calyx tube at maturity, 3.0–6.0 mm long and 2.5–5.7 mm wide, short stipitate, the placenta firmly adherent; seeds ovoid to oblong, blunt, longitudinally wrinkled, (0.5–)0.65–0.85 mm long, 25–70(–95) per capsule; pollen grains large, tricolporate with semitectate, microreticulate exines, diameter (mean, followed parenthetically by range) of polar axis 41.4 (34.0–46.1) μ m, equatorial axis 44.4 (37.5–49.2) μ m.

TYPE: USA, Oregon, Wallowa Co., loosely erect or hanging from seasonally moist basalt cliffs with sw. exposures, mostly in partial shade or occasionally full sunlight, on e. side of Horse Cr., ca. 12 km s. of the Imnaha R. and ca. 21 km w. of the Snake R. (T1N R49E S7), 1075 m, 2 Jul 1980, *Meinke & Kennison 2656* (Holotype: OSC; isotypes: ID, NY, ORE, UC, US, WS, WTU).

PARATYPES: USA, Oregon, Wallowa Co., along Horse Cr. (T2N R48E S36), 900 m, 20 Jun 1979, *Leary & Leary 3312* (OSC); Horse Cr., ca. 14 km s. of the Imnaha R., 1150 m, 26 Jun 1979, *Meinke, Leary, & Bafus 2365* (OSC).

Mimulus hymenophyllus is restricted, insofar as is currently known, to the deep canyons of Horse and Cow Creeks in southeast Wallowa County, Oregon at altitudes from ca. 850 to 1300 m. Populations of the species are scattered on steep cliffs of gray basalt with western or southwestern aspects, occurring within narrow, isolated bands of *Pseudotsuga menziesii*-*Pinus ponderosa* forest maintained by the northerly downward flow of cool air from the Wallowan uplands. Additional associate species include *Holodiscus discolor*, *Symphoricarpos albus*, *Berberis repens*, *Ribes velutinum*, *R. aureum*, *Penstemon wilcoxii*, *P. triphyllus*, *Glossopetalon nevadense* var. *stipuliferum*, *Floerkea proserpinacoides*, *Sedum leibergii*, *Thelypodium laciniatum*, and *Cystopteris fragilis*. There are several other similar drainages in the area which although unexplored are anticipated to shelter populations of *M. hymenophyllus* as well.

Flowering is initiated in late April and continues more or less continuously through August or early September, depending on elevation and available moisture. Capsules first mature in late May or early June.

Mimulus hymenophyllus apparently is most closely related to *M. jungermannioides* Suksdorf (sect. *Paradanthus*), a localized perennial endemic to basalt outcrops in the Columbia River Basin of north-central Oregon and reputedly adjacent Washington (Pennell 1951, Cronquist 1959). The two species possess lax habits of similar form and size, both being adapted to crevices in steep, basalt cliffs overlooking riparian habitats. In addition, their pubescence type, shape and venation of the leaf blades, and calyx construction are essentially identical. There are a number of marked morphological and ecological differences between the taxa, however, amply justifying separation at the species level. These data are outlined in Table 1.

The known populations of *M. hymenophyllus* and *M. jungermannioides* are widely separated geographically (Meinke, unpubl. data). Their respective narrow distribution patterns suggest that they are probably glacial relicts, but their evolutionary relationship to each other and related elements within sect. *Paradanthus* have yet to be assessed. The relatively scant seed production, large seed size, and "gigas" pollen grains of *M. hymenophyllus*, the latter feature the largest reported for the section (Argue, unpubl. data) are reminiscent of a polyploid condition (Argue, pers. comm.; Stebbins 1971). Chromosome counts, however, remain to be completed for both species.

In her monograph of the genus *Mimulus*, Grant (1924) allied *M. jungermannioides* with *M. moschatus* Dougl. ex Lindl. and *M. floribundus* Dougl. ex Lindl., two polymorphic species widespread in western North America, and *M. arenarius* Grant, a regional endemic of the central Sierra Nevada in California. *Mimulus hymenophyllus* displays strong affinities with this assemblage also, all of the species sharing a similar symmetrical calyx shape and structure as well as an

TABLE 1. MORPHOLOGICAL AND ECOLOGICAL DISTINCTIONS BETWEEN *M. hymenophyllus* MEINKE AND *M. jungermannioides* SUKSDORF.

Character	<i>M. hymenophyllus</i>	<i>M. jungermannioides</i>
<u>Morphology</u>		
Reproduces vegetatively from subterranean buds	No	Yes
Pubescence	Sparse, hairs all less than 0.8 mm	Moderate to very heavy, many hairs 1.0–1.5 mm
Fruiting pedicels	0.5–1.8 times petiole length	(2.5–)4–15 times petiole length
Calyx length	3.5–5.5 mm in flower, barely longer in fruit	5.0–9.0 mm in flower, up to 12.5 mm in fruit
Corolla length	18–28 mm, 3–4 times calyx length	14–20(–24) mm, 1.8–3 times calyx length
Capsule	3.0–6.0 mm long, rounded to ovate, mucronate	5.0–9.0 mm long, elliptic to lanceolate, attenuate
Seeds	0.65–0.85 mm long, 25–70(–95) per capsule: \bar{x} = 45	0.35–0.5 mm long, 75–200 per capsule: \bar{x} = 135
Pollen grain diameter (\bar{X}):		
Polar axis	41.4 μ m	31.0 μ m
Equatorial axis	44.4 μ m	34.4 μ m
<u>Ecology</u>		
General habitat	Within mesic coniferous forest type	Within xeric sagebrush-bunchgrass type
Elevational range	Ca. 850–1300 m	Ca. 95–370 m

unusual sticky or slimy glandular vesture on the vegetative parts. The significance of this exudate, which varies in its degree of copiousness from species to species, has not been determined. Recent pollen analysis of the genus (Argue 1980, and unpubl. data) tends to support this proposed alliance. Palynological studies also indicate, in support of Pennell (1951), that a reevaluation of the broad species concept, which is generally accepted today for *M. moschatus*, might be appropriate. Pennell advocated taxonomic recognition of several morphogeographic phases of *M. moschatus*, in spite of relatively broad zones of intergradation. A revival of this interpretation founded on current evidence would probably have implications in future evolutionary studies of *M. hymenophyllus* and its relatives. It is suspected that *M. hymenophyllus* and *M. jungermannioides* are common derivatives of one of these forms of *M. moschatus*, possibly splitting from that entity as a single unit and then diverging later under local ecological pressure. Prelim-

inary phylogeographic research (Meinke, unpubl. data) suggests that a north to south migration was responsible for current distribution patterns of the two species, leading to speculation that their common hypothetical ancestor is or was indigenous to eastern Washington.

Mimulus hymenophyllus is noteworthy in that it is the single member of its large genus that may be endemic to Oregon. Although it has been recorded from only a few small populations, it exists in remote country far from significant disturbing influences. Development of this area in the foreseeable future by government or private interests appears very unlikely. Therefore, despite its overall rarity and limited occurrence within its range, this species should not be considered threatened or endangered at this time. Periodic monitoring of its populations is recommended.

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